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## Nobel Lecture: The Economics of Being Poor

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Poor people in low-income countries are no less concerned about improving their lot and that of their children than those of us who have incomparably more income. They are also competent in using their meager resources. Many low-income countries have advanced substantially in recent decades in improving the quality of their population and in acquiring useful knowledge. These achievements imply favorable economic prospects, provided they are not dissipated by politics.

Most of the people in the world are poor, so if we knew the economics of being poor we would know much of the economics that really matters. Most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture we would know much of the economics of being poor.

People who are rich find it hard to understand the behavior of poor people. Economists are no exception, for they, too, find it difficult to comprehend the preferences and scarcity constraints that determine the choices that poor people make. We all know that most of the world's people are poor, that they earn a pittance for their labor, that half and more of their meager income is spent on food, that they reside predominantly in low-income countries, and that most of them are earning their livelihood in agriculture. What many economists fail to understand is that poor people are no less concerned about improving their lot and that of their children than rich people are.

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What we have learned in recent decades about the economics of agriculture will appear to most reasonably well-informed people to be paradoxical. We have learned that agriculture in many low-income countries has the potential economic capacity to produce enough food for the still-growing population and in so doing can improve significantly the income and welfare of poor people. The decisive factors of production in improving the welfare of poor people are not space, energy, and cropland; the decisive factor is the improvement in population quality.

In discussing these propositions, I shall first identify two intellectual mistakes that have marred the work of many economists. I shall then point out that most observers overrate the economic importance of land and greatly underrate the importance of the quality of human agents. Last, I shall present measurements of the increases in population quality that low-income countries are currently achieving.

Much of what I have learned about these propositions I owe to the research of predoctoral and postdoctoral students, to subsequent studies during their professional careers, and to my academic colleagues. In recent decades their work has produced a veritable explosion in the understanding of the economics of human capital, with special reference to the economics of research, the responses of farmers to new profitable production techniques, the connection between production and welfare, and the economics of the family.

### Mistakes by Economists

This branch of economics has suffered from several intellectual mistakes. The major mistake has been the presumption that standard economic theory is inadequate for understanding low-income countries and that a separate economic theory is needed. Models developed for this purpose were widely acclaimed until it became evident that they were at best intellectual curiosities. The reaction of some economists was to turn to cultural and social explanations for the alleged poor economic performance of low-income countries. Quite understandably, cultural and behavioral scholars are uneasy about this use of their studies. Fortunately, the intellectual tide has begun to turn. Increasing numbers of economists have come to realize that standard economic theory is just as applicable to the scarcity problems that confront low-income countries as to the corresponding problems of high-income countries.

A second mistake is the neglect of economic history. Classical economics was developed when most people in western Europe were very poor, barely scratching out subsistence from the poor soils they tilled, and were condemned to a short life span. As a result, early economists

dealt with conditions that were similar to those that prevail in low-income countries today. In Ricardo's day about half of the family income of laborers in England went for food. So it is today in many low-income countries. Marshall (1920) tells us that "... English labourers' weekly wages were often less than the price of a half bushel of good wheat" at the time Ricardo published his classic work. The weekly wage of the plowman in India is currently somewhat less than the price of two bushels of wheat (Schultz 1977; in press). In India many people live under the Ricardian shadow. Understanding the experience and achievements of poor people over the ages can contribute much to understanding the problems and possibilities of low-income countries today. That kind of understanding is far more important than the most detailed and exact knowledge about the surface of the earth, or of ecology, or of tomorrow's technology.

Historical perception is also lacking with respect to population. We extrapolate global statistics and are horrified by our interpretation of them, mainly that poor people breed like lemmings headed toward their own destruction. Yet that is not what happened looking back at our own social and economic history when people were poor. It is equally false with respect to population growth in today's poor countries.

### Land Is Overrated

A widely held view—the natural earth view—is that there is a virtually fixed land area suitable for growing food and a supply of energy for tilling the land that is being depleted. According to this view, it is impossible to continue to produce enough food for the growing world population. An alternative view—the social-economic view—is that man has the ability and intelligence to lessen his dependence on cropland, on traditional agriculture, and on depleting sources of energy and can reduce the real costs of producing food for the growing world population. By means of research we discover substitutes for cropland, which Ricardo could not have anticipated, and as incomes rise parents reveal a preference for fewer children, substituting quality for quantity of children, which Malthus could not have foreseen. It is ironic that economics, long labeled the dismal science, is capable of showing that the bleak natural earth view for food is not compatible with economic history, that history demonstrates that we can augment resources by advances in knowledge. I agree with Margaret Mead: "The future of mankind is open ended." Mankind's future is not foreordained by space, energy, and cropland. It will be determined by the intelligent evolution of humanity.

Differences in the productivity of the soils are not a useful variable

to explain why people are poor in long-settled parts of the world. People have been poor for ages both on the Deccan Plateau where the productivity of the rain-fed soils is low and on the highly productive soils of south India. In Africa, people on the unproductive soils of the southern fringes of the Sahara, on the somewhat more productive soils on the steep slopes of the Rift landform, and on the highly productive alluvial lands along and at the mouth of the Nile all have one thing in common: they are very poor. Similarly, the much publicized differences in land-population ratio throughout the low-income countries do not produce comparable differences in poorness. What matters most in the case of farmland are the incentives and associated opportunities that farm people have to augment the effective supply of land by means of investments that include the contributions of agricultural research and the improvement of human skills.

A fundamental proposition documented by much recent research is that an integral part of the modernization of the economies of high- and low-income countries is *the decline in the economic importance of farmland and a rise in that of human capital—skills and knowledge.*

Despite economic history, scratch an economist and you will find that his ideas about land are still, as a rule, those of Ricardo. But Ricardo's concept of land, "the original and indestructible powers of the soil," is no longer adequate, if ever it was. The share of national income that accrues as land rent and the associated social and political importance of landlords have declined markedly over time in high-income countries, and they are also declining in low-income countries. Why is Ricardian Rent losing its economic sting? There are two primary reasons: First, the modernization of agriculture has over time transformed raw land into a vastly more productive resource than it was in its natural state, and second, agricultural research has provided substitutes for cropland. With some local exceptions, the original soils of Europe were poor in quality. They are today highly productive. The original soils of Finland were less productive than the nearby western parts of the Soviet Union, yet today the croplands of Finland are superior. Japanese croplands were originally much inferior to those of northern India; they are greatly superior today. Some part of these changes, both in high- and low-income countries, is the consequence of agricultural research, including the research embodied in purchased agricultural inputs. There are new substitutes for cropland (call it land augmentation if you so prefer). The substitution process is well illustrated by corn. The corn acreage harvested in the United States in 1979 was 33 million acres less than in 1932. Yet the 7.76 billion bushels produced in 1979 was three times the amount produced in 1932.

### The Quality of Human Agents Is Underrated

While land per se is not a critical factor in being poor, the human agent is: Investment in improving population quality can significantly enhance the economic prospects and the welfare of poor people. Child care, home and work experience, the acquisition of information and skills through schooling and in other ways consisting primarily of investment in health and schooling can improve population quality. Such investments in low-income countries have, as I shall show, been successful in improving the economic prospects wherever they have not been dissipated by political instability. Poor people in low-income countries are not prisoners of an ironclad poverty equilibrium that economics is unable to break. There are no overwhelming forces that nullify all economic improvements, causing poor people to abandon the economic struggle. It is now well documented that in agriculture poor people do respond to better opportunities.

The expectations of human agents in agriculture—farm laborers and farm entrepreneurs who both work and allocate resources—are shaped by new opportunities and by the incentives to which they respond. These incentives are explicit in the prices that farmers receive for their products and in the prices they pay for producer and consumer goods and services that they purchase. These incentives are greatly distorted in many low-income countries (Schultz 1978a). The effect of these government-induced distortions is to reduce the economic contribution that agriculture is capable of making.

The "reason" why governments tend to introduce distortions that discriminate against agriculture is that internal politics generally favor the urban population at the expense of rural people, despite the much greater size of the rural population.<sup>1</sup> The political influence of urban consumers and industry enables them to exact cheap food at the expense of the vast number of poor rural people. This discrimination against agriculture is rationalized on the grounds that agriculture is inherently backward and that its economic contribution is of little importance despite the occasional "green revolution." The lowly cultivator is viewed as indifferent to economic incentives because it is presumed that he is strongly committed to his traditional ways of cultivation. Rapid industrialization is viewed as the key to economic progress. Policy is designed to give top priority to industry, which includes keeping food grains cheap. It is regrettable but true that this doctrine is still supported by some donor agencies and rationalized by some economists in high-income countries.

<sup>1</sup> For a fuller discussion, see Schultz (1978a).

*Entrepreneurs*

Farmers the world over, in dealing with costs, returns, and risks, are calculating economic agents. Within their small, individual, allocative domain they are fine-tuning entrepreneurs, tuning so subtly that many experts fail to recognize how efficient they are. I first presented an analysis of this entrepreneurial behavior in *Transforming Traditional Agriculture* (Schultz 1964). Although farmers differ for reasons of schooling, health, and experience in their ability to perceive, to interpret, and to take appropriate action in responding to new information, they provide an essential human resource which is entrepreneurship (Welch 1970, 1978; Evenson 1978). On most farms there is a second enterprise, the household. Women are also entrepreneurs in allocating their own time and in using farm products and purchased goods in household production (Schultz 1974). This allocative ability is supplied by millions of men and women on small-scale producing units; agriculture is in general a highly decentralized sector of the economy. Where governments have taken over this function in farming they have prevented this entrepreneurial talent from being used, and these governments have been unsuccessful in providing an effective allocative substitute capable of modernizing agriculture. The allocative roles of farmers and of farm women are important, and their economic opportunities really matter (Schultz 1978a).

Entrepreneurship is also essential in research. All research is a venturesome business. It entails allocating scarce resources. It requires organization. Someone must decide how to allocate the limited resources available for research, given the existing state of knowledge. The very essence of research is that it is a dynamic venture into the unknown or partially known. Funds, organizations, and competent scientists are necessary. They are not sufficient. Research entrepreneurship is required, be it by scientists or by others engaged in the research sector of the economy (Schultz 1979a).

*Inevitability of Disequilibria*

The transformation of agriculture into an increasingly more productive state, a process that is commonly referred to as "modernization," entails all manner of adjustments in farming as better opportunities become available. I have shown that the value of the ability to deal with disequilibria is high in a dynamic economy (Schultz 1975).

Such *disequilibria are inevitable*. They cannot be eliminated by law, by public policy, and surely not by rhetoric. Governments cannot perform efficiently the function of farm entrepreneurs.

Future historians will no doubt be puzzled by the extent to which

economic incentives were impaired during recent decades. The dominant intellectual view is antagonistic to agricultural incentives, and the prevailing economic policies deprecate the function of producer incentives. For lack of incentives the unrealized economic potential of agriculture in many low-income countries is large (Johnson 1977, 1978). Technical possibilities have become increasingly more favorable, but the economic incentives that are required for farmers in these countries to realize this potential are in disarray, either because the relevant information is lacking or because the prices and costs they face have been distorted. For want of profitable incentives, farmers have not made the necessary investments, including the purchase of superior inputs. Interventions by governments are currently the major cause of the lack of optimum economic incentives.

*Achievements in Population Quality*

I now turn to measurable gains in the quality of both farm and nonfarm people (Schultz 1979b, 1979c). Quality in this context consists of various forms of human capital. I have argued elsewhere (Schultz 1974) that, while a strong case can be made for using a rigorous definition of human capital, it will be subject to the same ambiguities that continue to plague capital theory in general and the capital concept in economic growth models in particular. Capital is two-faced, and what these two faces tell us about economic growth, which is a dynamic process, are, as a rule, inconsistent stories. It must be so because the cost story is a tale about sunk investments, and the other story pertains to the discounted value of the stream of services that such capital renders, which changes with the shifting sands of growth. But worse still is the capital homogeneity assumption underlying capital theory and the aggregation of capital in growth models. As Hicks (1965) has taught us, the capital homogeneity assumption is the disaster of capital theory. This assumption is demonstrably inappropriate in analyzing the dynamics of economic growth that is afloat on capital inequalities because of the differences in the rates of return, whether the capital aggregation is in terms of factor costs or in terms of the discounted value of the lifetime services of its many parts. Nor would a catalog of all existing growth models prove that these inequalities are equals. But why try to square the circle? If we were unable to observe these inequalities, we would have to invent them because *they are the mainspring of economic growth*. They are the mainspring because they are the compelling economic signals of growth. Thus, one of the essential parts of economic growth is concealed by such capital aggregation.

The value of additional human capital depends on the additional well-being that human beings derive from it. Human capital contributes to labor productivity and to entrepreneurial ability. This allocative ability is valuable in farm and nonfarm production, in household production, and in the time and other resources that students allocate to their education. It is also valuable in migration to better job opportunities and to better locations in which to live. It contributes importantly to satisfactions that are an integral part of current and future consumption.

My approach to population quality is to treat quality as a scarce resource, which implies that it has an economic value and that its acquisition entails a cost. In analyzing human behavior that determines the type and amount of quality that is acquired over time, the key is the relation between the returns from additional quality and the costs of acquiring it. When the returns exceed costs, the stock of population quality will be enhanced. This means that increases in the supply of any quality component are a response to a demand for it. It is a supply-demand approach to investment behavior because all quality components are here treated as durable scarce resources that are useful over some period of time.

My hypothesis is that the returns to various quality components are increasing over time in many low-income countries; the rents that entrepreneurs derive from their allocative ability rise, as do the returns to child care, schooling, and improvements in health. Furthermore, the rates of return are enhanced by the reductions in the costs of acquiring most of these quality components. Over time the increases in the demand for quality, in children and on the part of adults in enhancing their own quality, reduce the demand for quantity; that is, quality and quantity are substitutes, and the reduction in demand for quantity favors having and rearing fewer children (Becker and Tomes 1976; Rosenzweig and Wolpin 1978). The movement toward quality contributes to the solution of the population "problem."

#### *Investment in Health*

Human capital theory treats everyone's state of health as a stock, that is, as health capital and its contribution as health services. Part of the quality of the initial stock is inherited and part is acquired. The stock depreciates over time and at an increasing rate in later life. Gross investment in human capital entails acquisition and maintenance costs. These investments include child care, nutrition, clothing, housing, medical services, and the use of one's own time. The flow of services that health capital renders consists of "healthy time" or

"sickness-free time," which are inputs into work, consumption, and leisure activities (Grossman 1972; Williams 1977).

The improvements in health revealed by the longer life span of people in many low-income countries have undoubtedly been the most important advance in population quality. Since about 1950, life expectancy at birth has increased 40 percent or more in many of these countries. People of western Europe and North America never attained so large an increase in life expectancy in so short a period. The decline in mortality of infants and very young children is only part of this achievement. The mortality of older children, youths, and adults is also down.

Ram and Schultz (1979) deal with the economics of these demographic developments in India. The results correspond to those in other low-income countries. In India from 1951 to 1971 life expectancy at birth of males increased by 43 percent and that of females by 41 percent. Life spans over the life cycle after age 10, 20, and on to age 60, for both males and females in 1971, were also decidedly longer than in 1951.

The favorable economic implications of these increases in life span are pervasive. Foremost are the satisfactions that people derive from longer life. While they are hard to measure, there is little room for doubt that the value of life expectancy is enhanced. Measurement, however, is not impossible. Usher (1978) devised an ingenious extension of theory to determine the utility that people derive from increases in life expectancy. His empirical analysis indicates that the additional utility increases substantially the value of personal income.

Longer life spans provide additional incentives to acquire more education as investments in future earnings. Parents invest more in their children. More on-the-job training becomes worthwhile. The additional health capital and the other forms of human capital tend to increase the productivity of workers. Longer life spans result in more years of participation in the labor force and bring about a reduction in "sick time." Better health and vitality of workers in turn lead to more productivity per man hour at work.

The Ram-Schultz study (1979) provides evidence on the gains in the productivity of agricultural labor in India, realized as a consequence of improvements in health. The most telling part of that evidence is the productivity effect of the "cycle" that has characterized the malaria program.

#### *Investment in Education*

Education accounts for much of the improvements in population quality. But reckoning the cost of schooling, the value of the work that

young children do for their parents must be included. Even for the very young children during their first years of school, most parents forego (sacrifice) the value of the work that children perform (Shortlidge 1976; Makhija 1977; Rosenzweig and Evenson 1977). Another distinctive attribute of schooling is the vintage effect by age over time. Starting from widespread illiteracy, as more schooling per child is achieved the older adults continue through life with little or no schooling, whereas the children on entering into adulthood are the beneficiaries.

The population of India grew about 50 percent between 1950-51 and 1970-71. School enrollment of children ages 6-14 rose over 200 percent. The rate of increase in secondary schools and universities was much higher (Government of India 1978). Since schooling is primarily an investment, it is a serious error to treat all schooling outlays as current consumption. This error arises from the assumption that schooling is solely a consumer good. It is misleading to treat public expenditures on schooling as "welfare" expenditures and as a use of resources that has the effect of reducing "savings." The same error occurs in the case of expenditures on health, both on public and private account.

The expenditures on schooling including higher education are a substantial fraction of national income in many low-income countries. These expenditures are *large* relative to the conventional national accounting measures (concepts) of savings and investment. In India the proportion that the costs of schooling bear to national income, savings, and investment is not only large but has tended to increase substantially over time (Ram and Schultz 1979, pp. 410-12 and table 2).

### *The Highly Skilled*

In assessing population quality, it is important not to overlook the increases in the stock of physicians, other medical personnel, engineers, administrators, accountants, and various classes of research scientists and technicians (Schultz 1979d).

The research capacity of a considerable number of low-income countries is impressive. There are specialized research institutes, research units within governmental departments, industrial sector research, and ongoing university research. The scientists and technicians engaged in these various research activities are university trained, some of them in universities abroad. The research areas include, among others, medicine, public health (control of communicable diseases and the delivery of health services), nutrition, industry, agriculture, and even some atomic energy research. I shall

touch briefly on agricultural research, because I know it best and because it is well documented.

The founding and financing of the International Agricultural Research Centers is an institutional innovation of a high order. The entrepreneurship of the Rockefeller Foundation in cooperation with the government of Mexico first launched this type of venture. But these centers, good as they are, are not a substitute for national agricultural research enterprises. Suffice it to give the flavor of the remarkable increases in the number of agricultural scientists between 1959 and 1974 in 22 selected low-income countries. All told, the number of scientist man-years devoted to agricultural research in these 22 countries increased more than three times during this period. By 1974 there was a corps of over 13,000 scientists, ranging from 110 in the Ivory Coast to over 2,000 in India (Boyce and Evenson 1975). Indian agricultural research expenditures between 1950 and 1968 also more than tripled in real terms.

We come to the bottom line. In India this investment in agricultural research has produced excellent results. An analysis by states within India shows the rate of return has been approximately 40 percent, which is indeed high compared with the returns from most other investments to increase agricultural production (Evenson and Kislev 1975).

### *Concluding Remark*

While there remains much that we do not know about the economics of being poor, our knowledge of the economic dynamics of low-income countries has advanced substantially in recent decades. We have learned that poor people are no less concerned about improving their lot and that of their children than those of us who have incomparably greater advantages. Nor are they any less competent in obtaining the maximum benefit from their limited resources. The central thrust of this lecture is that population quality and knowledge do matter. A goodly number of low-income countries have a positive record in improving population quality and in acquiring useful knowledge. These achievements imply favorable economic prospects, provided they are not dissipated by politics and governmental policies that discriminate against agriculture.

Even so, most of the people throughout the world continue to earn a pittance from their labor. Half or even more of their meager income is spent on food. Their life is harsh. Farmers in low-income countries do all they can to augment their production. What happens to these farmers is of no concern to the sun, or to the earth, or to the behavior of the monsoons and the winds that sweep the face of the earth.

Farmers' crops are in constant danger of being devoured by insects and pests. Nature is host to thousands of species that are hostile to the endeavors of farmers, especially so in low-income countries. We in the high-income countries have forgotten the wisdom of Alfred Marshall when he wrote, "Knowledge is the most powerful engine of production; it enables us to subdue Nature and satisfy our wants" (1920).

### References

- Becker, Gary S., and Tomes, Nigel. "Child Endowments and the Quantity and Quality of Children." *J.P.E.* 84, no. 4, pt. 2 (August 1976): S143-S162.
- Boyce, James K., and Evenson, Robert E. *National and International Agricultural Research and Extension Programs*. New York: Agricultural Development Council, 1975.
- Evenson, Robert E. "The Organization of Research to Improve Crops and Animals in Low Income Countries." In *Distortions of Agricultural Incentives*, edited by Theodore W. Schultz. Bloomington: Indiana Univ. Press, 1978.
- Evenson, Robert E., and Kislev, Yoav. *Agricultural Research and Productivity*. New Haven, Conn.: Yale Univ. Press, 1975.
- Government of India, Planning Commission. *Draft Five Year Plan 1978-83*. New Delhi: Government of India Press, 1978.
- Grossman, Michael. *The Demand for Health*. Nat. Bur. Econ. Res., Occasional Paper no. 119. New York: Columbia Univ. Press, 1972.
- Hicks, John R. *Capital and Growth*. Oxford: Clarendon Press, 1965.
- Johnson, D. Gale. "Food Production Potentials in Developing Countries: Will They Be Realized?" Bur. Econ. Studies, Occasional Paper no. 1. St. Paul, Minn.: Macalester College, 1977.
- . "International Prices and Trade in Reducing the Distortions of Incentives." In *Distortions of Agricultural Incentives*, edited by Theodore W. Schultz. Bloomington: Indiana Univ. Press, 1978.
- Makhija, Indra. "The Economic Contribution of Children and Its Effects on Fertility and Schooling: Rural India." Ph.D. dissertation, Univ. Chicago, 1977.
- Marshall, Alfred. *Principles of Economics*. 8th ed. New York: Macmillan, 1920.
- Ram, Rati, and Schultz, Theodore W. "Life Span, Health, Savings, and Productivity." *Econ. Development and Cultural Change* 27 (April 1979): 399-421.
- Rosenzweig, Mark R., and Evenson, Robert E. "Fertility, Schooling and the Economic Contribution of Children in Rural India: An Econometric Analysis." *Econometrica* 45 (July 1977): 1065-79.
- Rosenzweig, Mark R., and Wolpin, Kenneth I. "Testing the Quantity-Quality Fertility Model: The Use of Twins as a Natural Experiment." Mimeographed. New Haven, Conn.: Yale Univ., Econ. Growth Center, October 1978.
- Schultz, Theodore W. *Transforming Traditional Agriculture*. New Haven, Conn.: Yale Univ. Press, 1964. Reprint. New York: Arno, 1976.
- . "Human Capital: Policy Issues and Research Opportunities." In *Human Resources*. New York: Columbia Univ. Press (for Nat. Bur. Econ. Res.), 1972.
- , ed. *Economics of the Family: Marriage, Children and Human Capital*. Chicago: Univ. Chicago Press, 1974.

- . "The Value of the Ability to Deal with Disequilibria." *J. Econ. Literature* 13 (September 1975): 827-46.
- . "On Economics, Agriculture, and the Political Economy." In *Decision-Making and Agriculture*, edited by Theodor Dams and Kenneth E. Hunt. 16th International Conference of Agricultural Economists, Nairobi, Kenya. Oxford: Alden, 1977.
- . "On Economics and Politics of Agriculture." In *Distortions of Agricultural Incentives*, edited by Theodore W. Schultz. Bloomington: Indiana Univ. Press, 1978. (a)
- . "What Are We Doing to Research Entrepreneurship?" In *Transforming Knowledge into Food in a Worldwide Context*. Minneapolis: Miller, 1978. (b)
- . "Concepts of Entrepreneurship and Agricultural Research." Kaldor Memorial Lecture. Agricultural Econ. Workshop, Univ. Chicago, paper no. 79:26. Ames: Iowa State Univ., 1979. (a)
- . "Investment in Population Quality throughout Low-Income Countries." In *World Population and Development: Challenges and Prospects*, edited by Philip M. Hauser. Syracuse, N.Y.: Syracuse Univ. Press, 1979. (b)
- . "Reckoning the Economic Achievements and Prospects of Low Income Countries." Snyder Memorial Lecture. West Lafayette, Ind.: Purdue Univ., 1979. (c)
- . "The Value of Higher Education in Low Income Countries: An Economist's View." Paris: Internat. Inst. Educ. Planning, 1979. (d)
- . "On the Economics of the Increases in the Value of Human Time over Time." In *Measurement, History and Factors of Economic Growth*, edited by R. E. O. Matthews. Fifth World Conference of the International Economic Association, Tokyo, August 1977. London: Macmillan, in press.
- Shortlidge, Robert L., Jr. "A Social-Economic Model of School Attendance in Rural India." Dept. Agricultural Econ., Occasional Paper no. 86. Ithaca, N.Y.: Cornell Univ., January 1976.
- Usher, Dan. "An Imputation to the Measure of Economic Growth for Changes in Life Expectancy." In *The Measurement of Economic and Social Performance*, edited by Milton Moss. New York: Columbia Univ. Press (for Nat. Bur. Econ. Res.), 1978.
- Welch, Finis. "Education in Production." *J.P.E.* 78, no. 1 (January/February 1970): 35-59.
- . "The Role of Investments in Human Capital and Agriculture." In *Distortions of Agricultural Incentives*, edited by Theodore W. Schultz. Bloomington: Indiana Univ. Press, 1978.
- Williams, Alan. "Health Service Planning." In *Studies in Modern Economic Analysis*, edited by Michael J. Artis and A. R. Nobay. Edinburgh: Blackwell, 1977.